AD-A020 877

# SPECIAL DATA COLLECTION SYSTEM EVENT REPORT. YELLOWSTONE NATIONAL PARK, WYOMING, 30 JUNE 1975

J. R. Woolson, et al

Teledyne Geotech

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# SPECIAL DATA COLLECTION SYSTEM EVENT REPORT
## Yellowstone National Park, Wyoming, 30 June 1975

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October 1975

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SDCS Event Report No. 30

Yellowstone National Park, Wyoming; 30 June 1975

This event report contains seismic data from the Special Data Collection System (SDCS), and other sources for the above event. Published epicenter information from seismic observations is:

| | "P" Arrival | Origin Time | Latitude | Longitude | $m_b$ | $M_s$ |
|---|---|---|---|---|---|---|
| NORSAR | 19:04:51.7 | 18:54:41 | 46.6N | 105.5W | 5.2 | N/A |
| LASA | 18:55:10.2 | 18:54:36 | 45.5N | 108.6W | N/A | N/A |
| PDE | | 18:54:14 | 44.7N | 110.8W | 6.0 | N/A |

Using SDCS stations, LASA and NORSAR, the epicenter location and magnitudes become

| | | | | |
|---|---|---|---|---|
| 18:54:16.5 | 44.9N | 110.3W | 5.3 | 5.6 |

All SDCS stations were operational during this period.

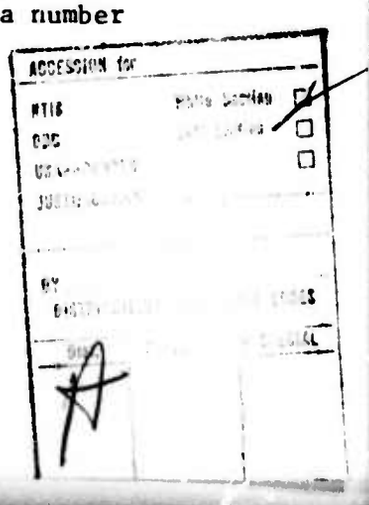
Short-period signals associated with this event were recorded at RK-ON, CPSO, WH2YK, FN-WV, LASA and NORSAR. HN-ME data were not included due to station timing problem. Horizontal channels at CPSO were not rotated due to unknown gain of the SPN channel.

Long-period signals were recorded at RK-ON, CPSO, WH2YK, FN-WV and ALPA. HN-ME data were not included due to station timing problem. Horizontal channels at FN-WV were not rotated because of signal clipping. Horizontal channels at CPSO were not rotated because of unknown gain of the LPN channel and signal clipping on the LPE channel. NORSAR long-period beam data were invalid and not included. LASA long-period data appears to be invalid.

Details of the program used to obtain beamed vertical, radial and transverse long-period data at ALPA and LASA are in the process of being reviewed. Vertical beams are probably valid while horizontal beams are questionable.

Scaling factors on plots are millimicrons at 1 Hz (not corrected for instrument response) with the exception of LASA and NORSAR short-period plots. LASA SP scaling factors are millimicrons per inch. Scaling factors are not reported for NORSAR short-period.

Examination of both short-period and long-period waveforms produced by this earthquake indicates a possible complex source mechanism, and raises a number of questions that this report does not attempt to resolve.



## STATION DESCRIPTION

| SITE CODE | LOCATION | SITE COORDINATES DEG MN SECS | ELEVATION METERS | INSTRUMENTATION SHORT-PERIOD | LONG-PERIOD |
|---|---|---|---|---|---|
| ALPA | Alaska | 65 14 00.0 N<br>147 44 36.0 W | 626 | None | 31300 |
| CPSO | McMinnville,<br>Tennessee | 35 35 41.4 N<br>085 34 13.5 W | 574 | 6480 V<br>7515 H | SL210 V<br>SL220 H |
| FN-WV | Franklin,<br>West Virginia | 38 32 58.0 N<br>079 30 47.0 W | 910 | KS36000 | KS36000 |
| LASA | Billings,<br>Montana | 46 41 19.0 N<br>106 13 20.0 W | 744 | HS10 | 7505A V<br>8700C H |
| HN-ME | Houlton,<br>Maine | 46 09 43.0 N<br>067 59 09.0 W | 213 | 18300 | SL210 V<br>SL220 H |
| NORSAR | Kjeller,<br>Norway | 60 49 25.4 N<br>010 49 56.5 E | 379 | HS10 | 7505A V<br>8700C H |
| RK-ON | Red Lake,<br>Ontario | 50 50 20.0 N<br>093 40 20.0 W | 366 | 18300 | SL210 V<br>SL220 H |
| WH2YK | White Horse,<br>Yukon | 60 41 41.0 N<br>134 58 02.0 W | 853 | 18300 | SL210 V<br>SL220 H |

Note: The orientation of the radial instruments at FN-WV is assumed to be 316° ± 5° based on empirical data (event recordings). Rotation, where performed, is referenced to this azimuth and may be questionable.

HYPOCENTER DETERMINATION

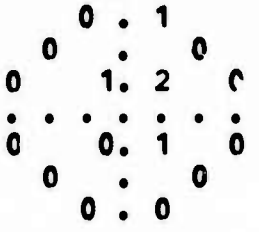
INPUT FOR EVENT 30 JUN 75
18:54:36.0 45.400N 108.500W 0KM.

| STA. | ARRIVAL | RESIDUALS CALC | RESIDUALS REST | DIST. REST | AZ. REST |
|---|---|---|---|---|---|
| LAC | 18 55 10.2 | -0.0 | 0.1 | 3.4 | 56.8 |
| RK-CN | 18 57 16.3 | 0.0 | 0.1 | 12.6 | 56.1 |
| CPO * | 18 58 54.0 | -7.4 * | -6.7 * | 21.0 | 107.8 |
| WH2YK | 18 59 06.5 | 0.0 | 0.3 | 21.5 | 326.0 |
| FN-WY | 18 59 29.2 | 0.0 | 0.2 | 23.8 | 94.7 |
| NAC | 19 04 51.7 | -0.0 | -0.7 | 64.3 | 27.7 |

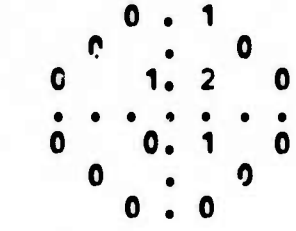
67 HERRIN TRAVEL TIME TABLES

| ORIGIN | LAT. | LONG. | DEPTH (KM) | SDV | IT | STA |
|---|---|---|---|---|---|---|
| 18:54:21.7 | 45.049N | 110.199W | 34. CALC | 0.0 | 4 | 5 |
| 18:54:16.5 | 44.919N | 110.307W | 0. REST | 0.4 | 3 | 5 |

CALC




REST




CHI2 COVERAGE ELLIPSE; 95 PER CENT CONF..LEVEL, SDV= 1.90
MAJOR 74.3KM. MINOR 34.0KM. AZ= 14 AREA= 7934 SQ.KM. REST

*Not used in hypocenter determination due to poor fit.

DATA SUMMARY

INPUT FOR EVENT 30 JUN 75
18:54:36.0 45.400N 108.500W 0KM.

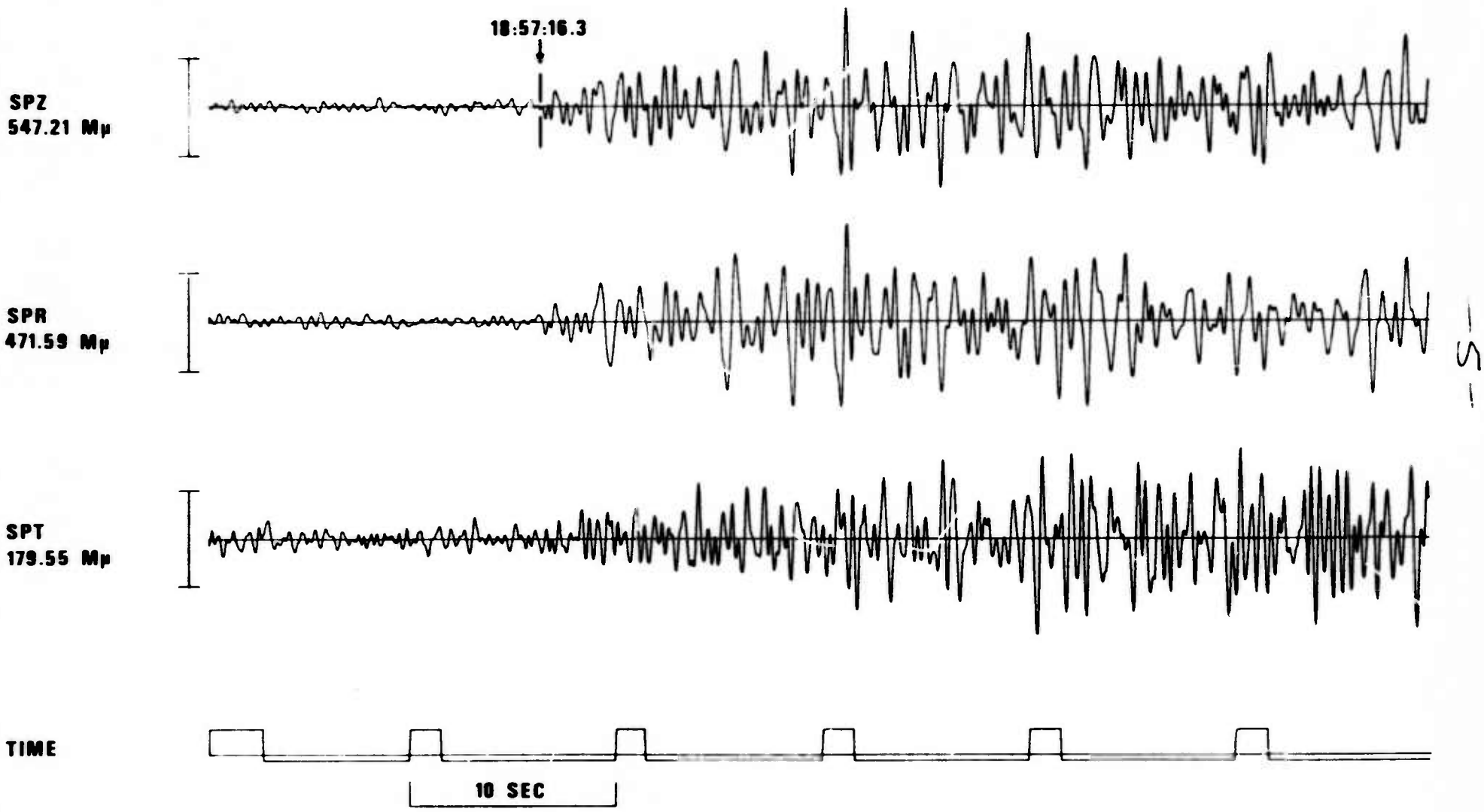
| STA. | PHASE | ARRIVAL TIME | INST | PER | A/T | MAGNITUDE MB | MS | DIR | DIST |
|---|---|---|---|---|---|---|---|---|---|
| LAC | EP | 18 55 10.2 | AE | | CLIPPED | | | | |
| RK-CNM | EP | 18 57 16.3 | SPZ | 0.4 | 146. | 5.90 | | | 12.6 |
| RK-CN | LQ | 19 01 21.0 | LPT | 21.0 | 2676. | | | | |
| RK-CN | LR | 19 02 15.0 | LPZ | 20.0 | CLIPPED | | 0.0 | | 12.6 |
| CFC * | EP | 18 58 54.0 | SPZ | 0.7 | 9. | 3.75 | | | 21.0 |
| CFC | LQ | 19 05 59.0 | LPT | 15.0 | CLIPPED | | | | |
| CFC | LR | 19 07 23.0 | LPZ | 17.0 | CLIPPED | | 0.0 | | 21.0 |
| WH2YK | EP | 18 59 06.5 | SPZ | 2.0 | 389. | 5.44 | | | 21.5 |
| WH2YK | LQ | 19 06 27.0 | LPT | 20.0 | 1291. | | | | |
| WH2YK | LR | 19 07 52.0 | LPZ | 18.0 | 3457. | | 5.99 | | 21.5 |
| FN-WY | EP | 18 59 29.2 | SPZ | 0.9 | 65. | 4.81 | | | 23.8 |
| ALPA | LQ | 19 10 32.0 | LPT | 29.0 | 270. | | | | |
| ALPA | LR | 19 12 50.0 | LPZ | 20.0 | 377. | | 5.16 | | 28.9 |
| NAC | EP | 19 04 51.7 | AE | 1.4 | 96. | 5.68 | | | 64.3 |

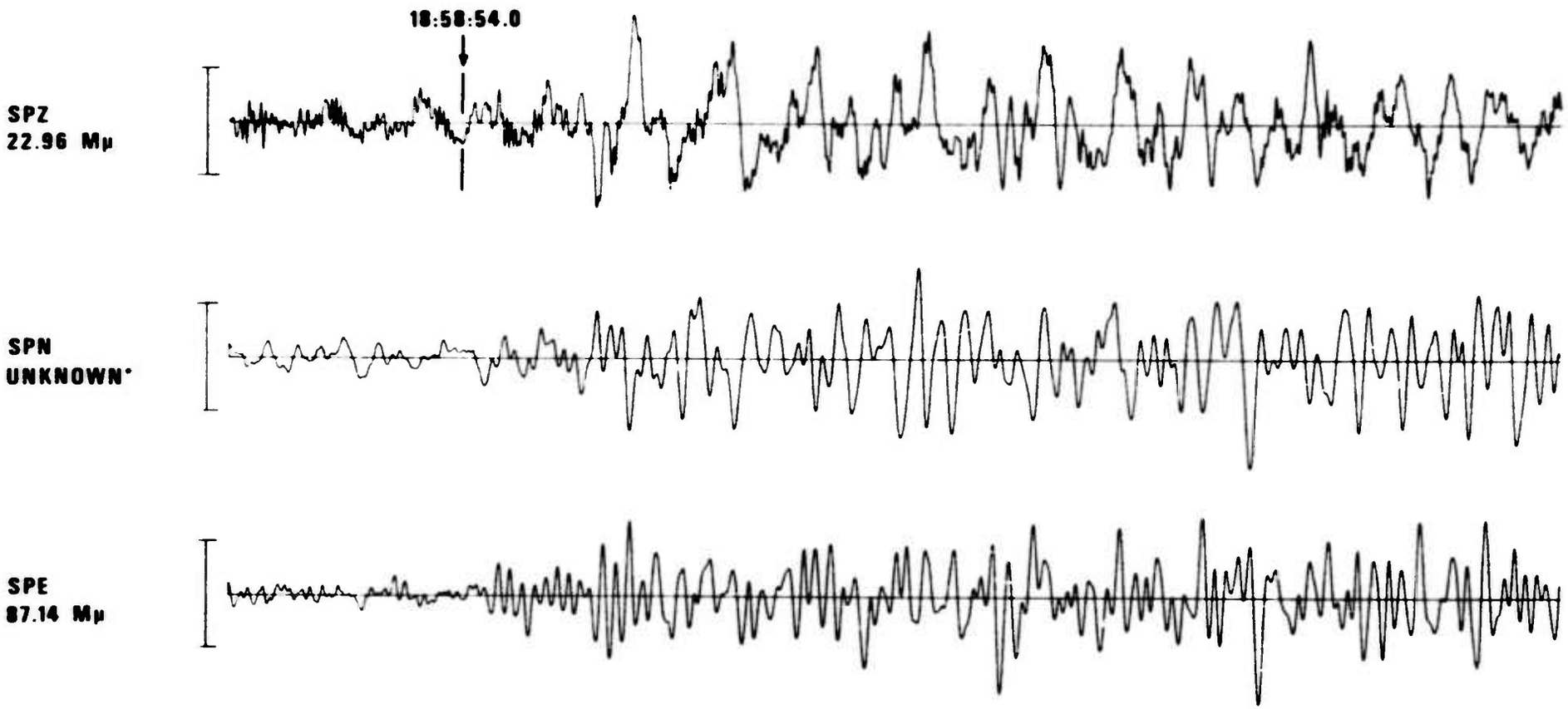
| ORIGIN | LAT. | LONG. | DEPTH (KM) | MAG | SDV | STA | LPMAG | LPSDV | LPSTA |
|---|---|---|---|---|---|---|---|---|---|
| 18:54:21.7 | 45.049N | 110.199W | 34. CALC | 5.26 | 0.43 | 3 | 5.57 | 0.6 | 2 |
| 18:54:16.5 | 44.919N | 110.307W | 0. REST | 5.31 | 0.45 | 3 | 5.57 | 0.6 | 2 |

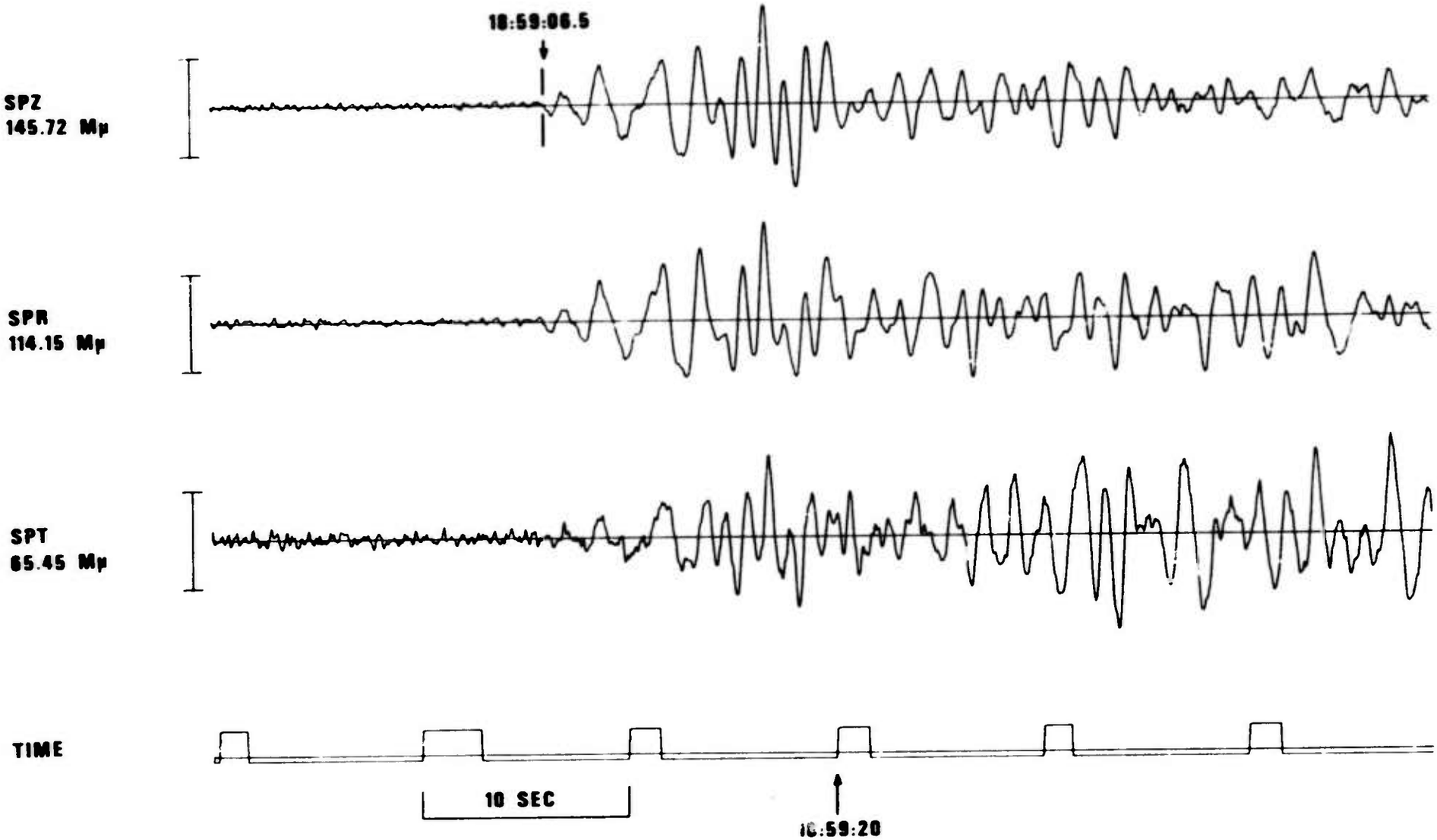
RK-CN NOT USED IN CALC RUN SP AVG. MAG.
RK-CN NOT USED IN REST RUN SP AVG. MAG.

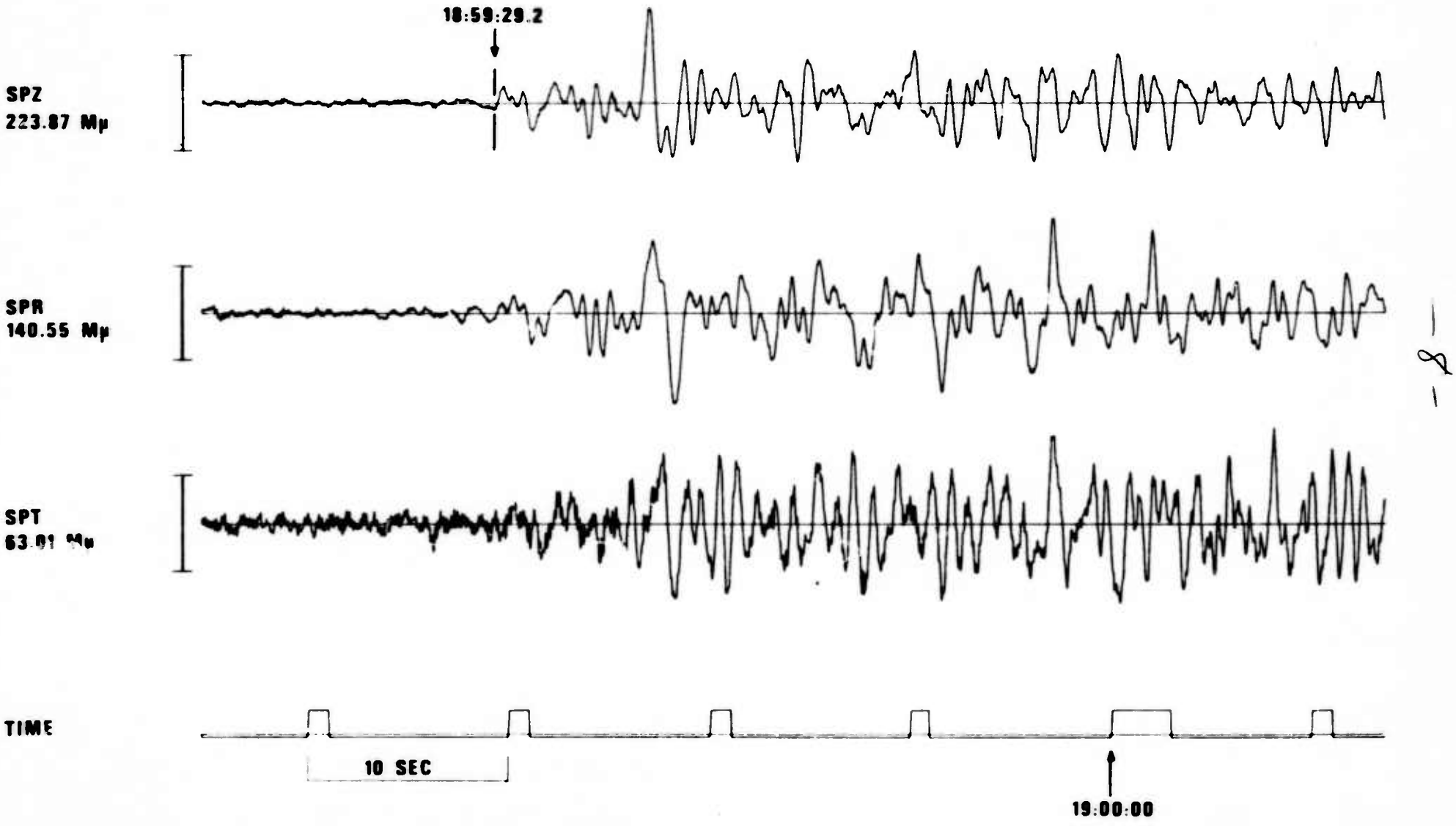
Short-period magnitudes ($m_b$) used in averaging are restricted to those recorded at distances between 20 and 110 degrees from the epicenter.

*Not used in hypocenter determination due to poor fit.


RK-ON 30 JUN 75
18:57:16.3
SPZ
547.21 Mμ
SPR
471.59 Mμ
SPT
179.55 Mμ
TIME
10 SEC

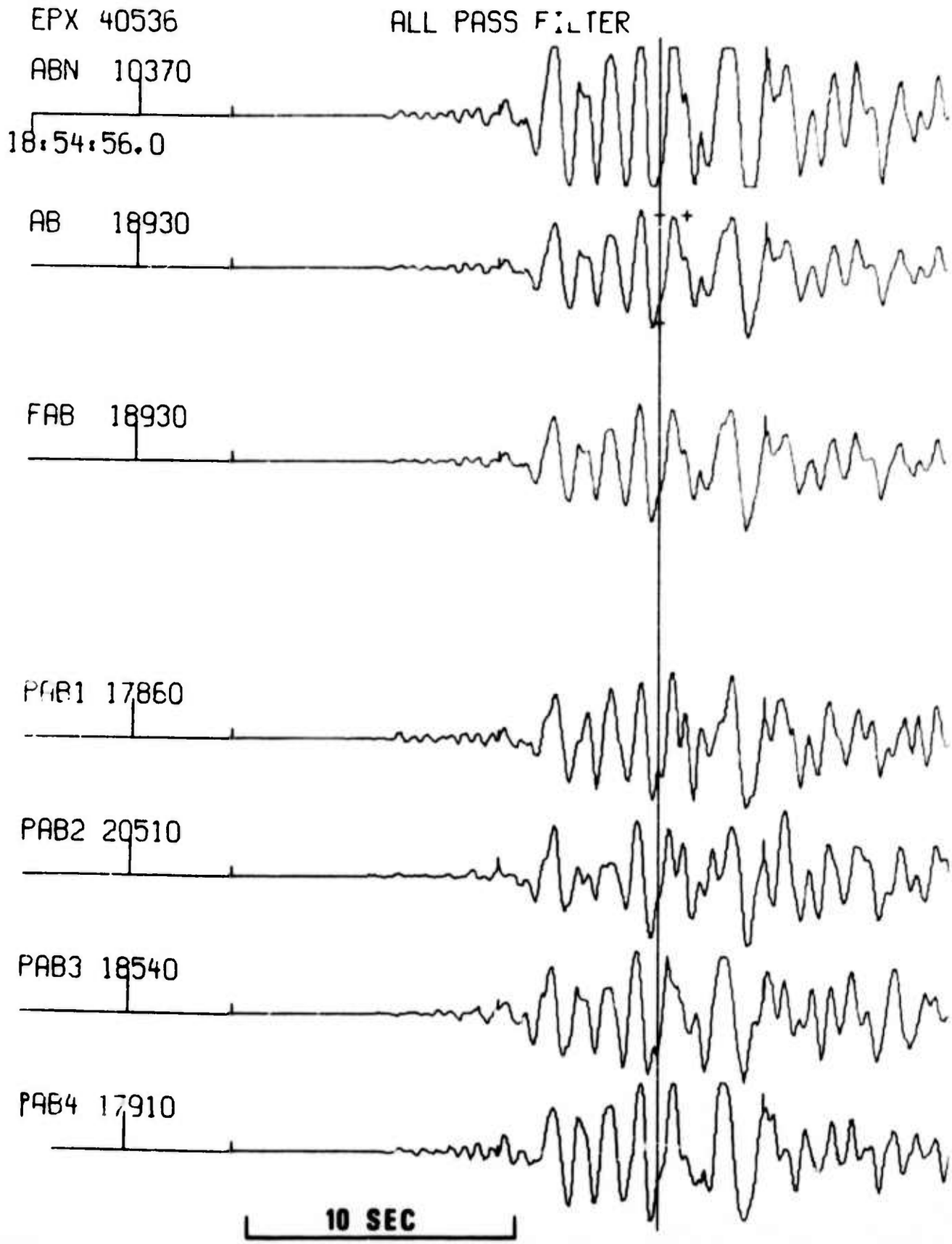

CPSO 30 JUN 75
18:58:54.0
SPZ
22.96 Mμ
SPN
UNKNOWN*
SPE
87.14 Mμ
10 SEC
*CALIBRATION SYSTEM INOPERATIVE


WH2YK 30 JUN 75
18:59:06.5
SPZ
145.72 Mμ
SPR
114.15 Mμ
SPT
65.45 Mμ
TIME
10 SEC
18:59:20


FN-WV 30 JUN 75
18:59:29.2
SPZ
223.87 Mμ
SPR
140.55 Mμ
SPT
TIME
10 SEC
19:00:00

**LASA**

1 30 JUN 1975
2 18 55 0 45.9N 108.0W OG D 5.2 456 MONTANA
3 18 55 26.0 LAO P 8505.9 1.1 7.7 1.5 240.5

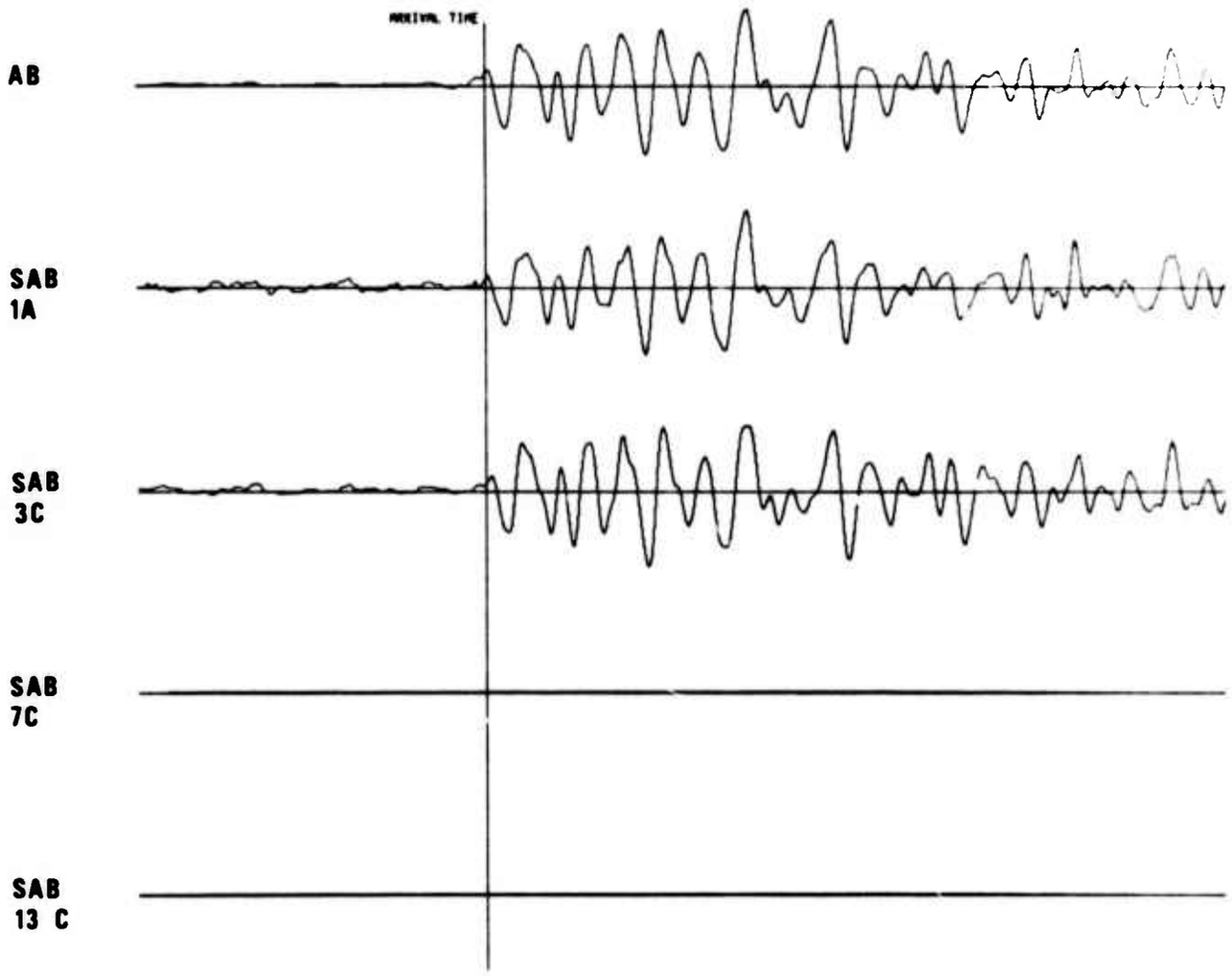


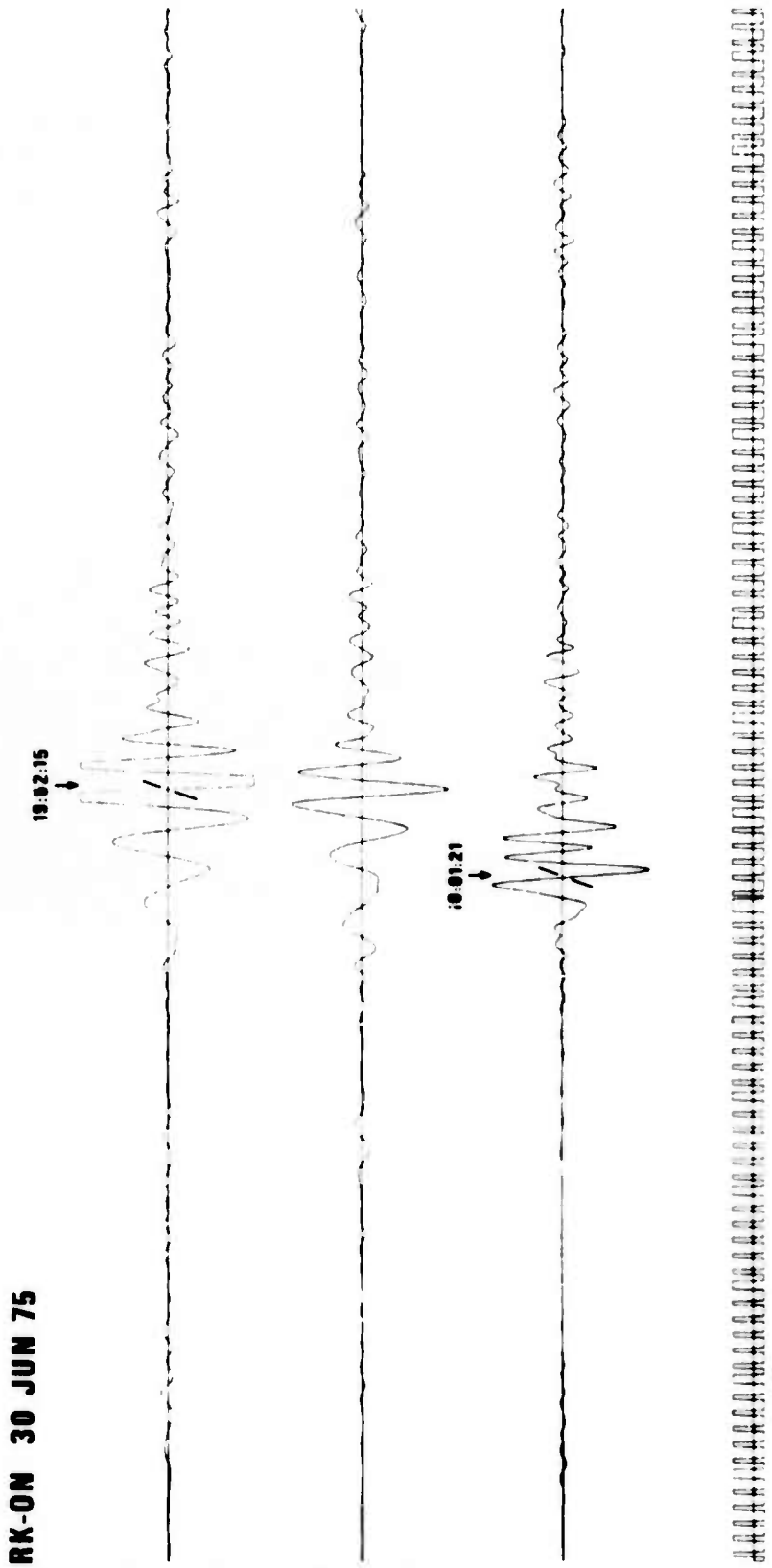
NORSAR EVENT FILE 1975 JUN 30

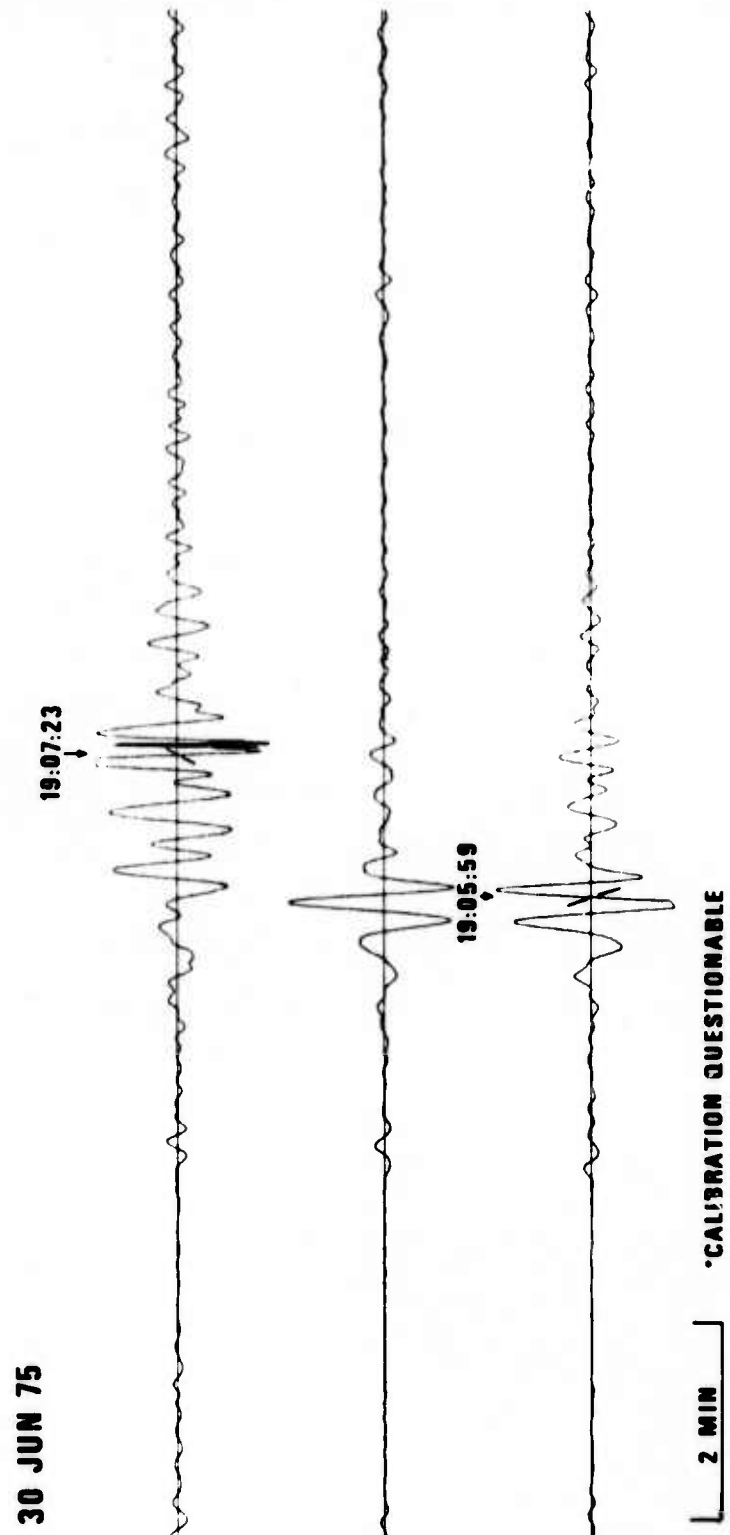
EPX NO. 90230 ARR. 19.4.53.4 46.6N 105.5W 4.7MB 33KM

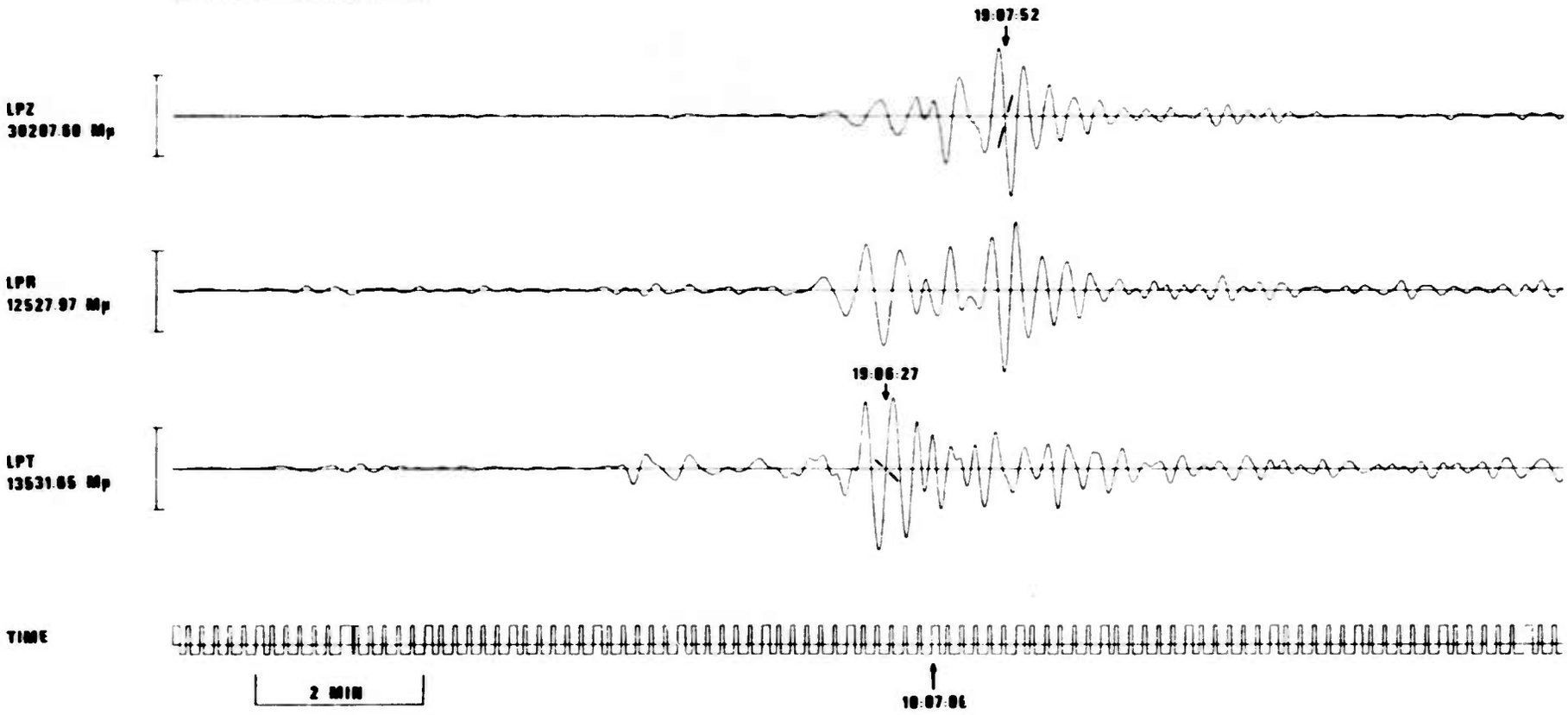
DIST - 61.2 AZI - 315.1 AMP = 13.1 PER = 1.4 UMETH 2

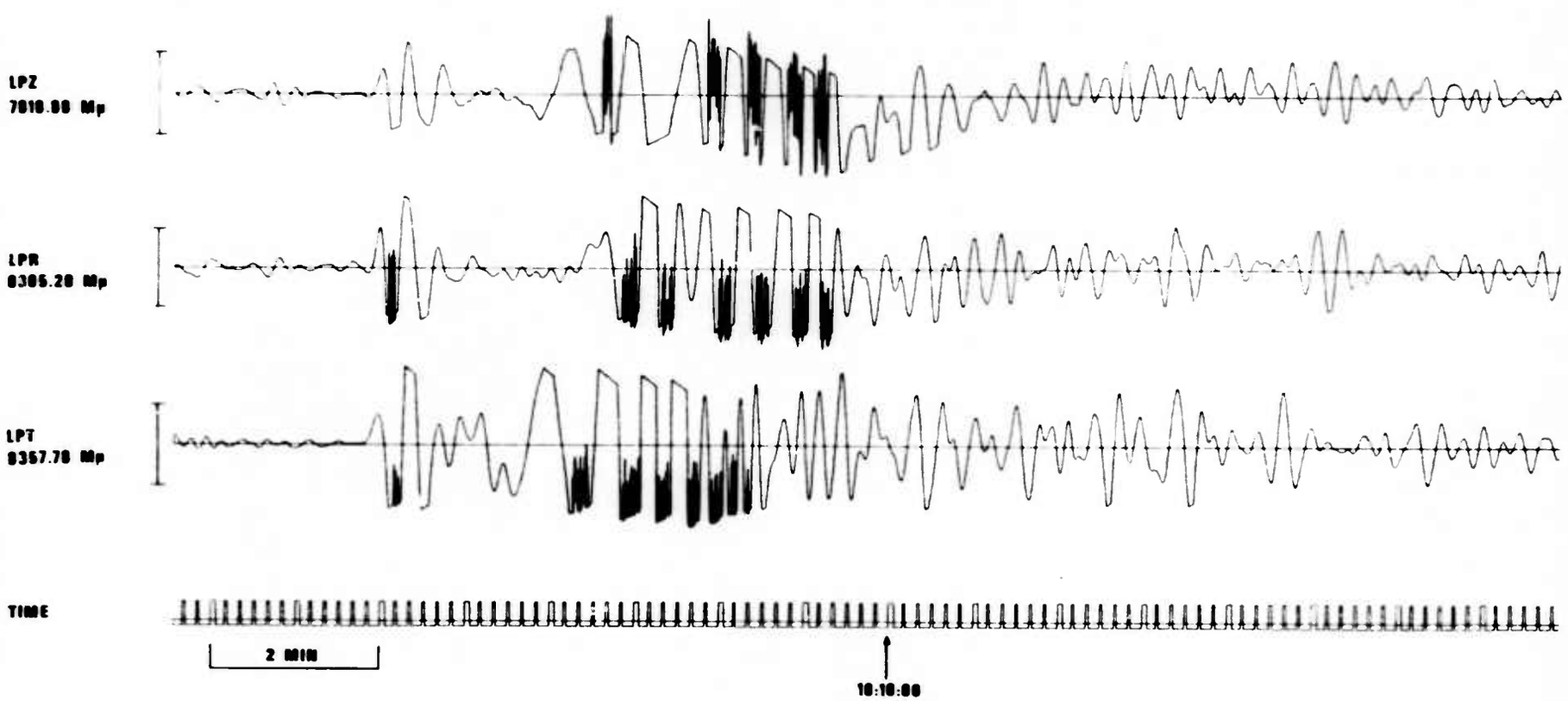
SCALE [——] = 5 SECONDS

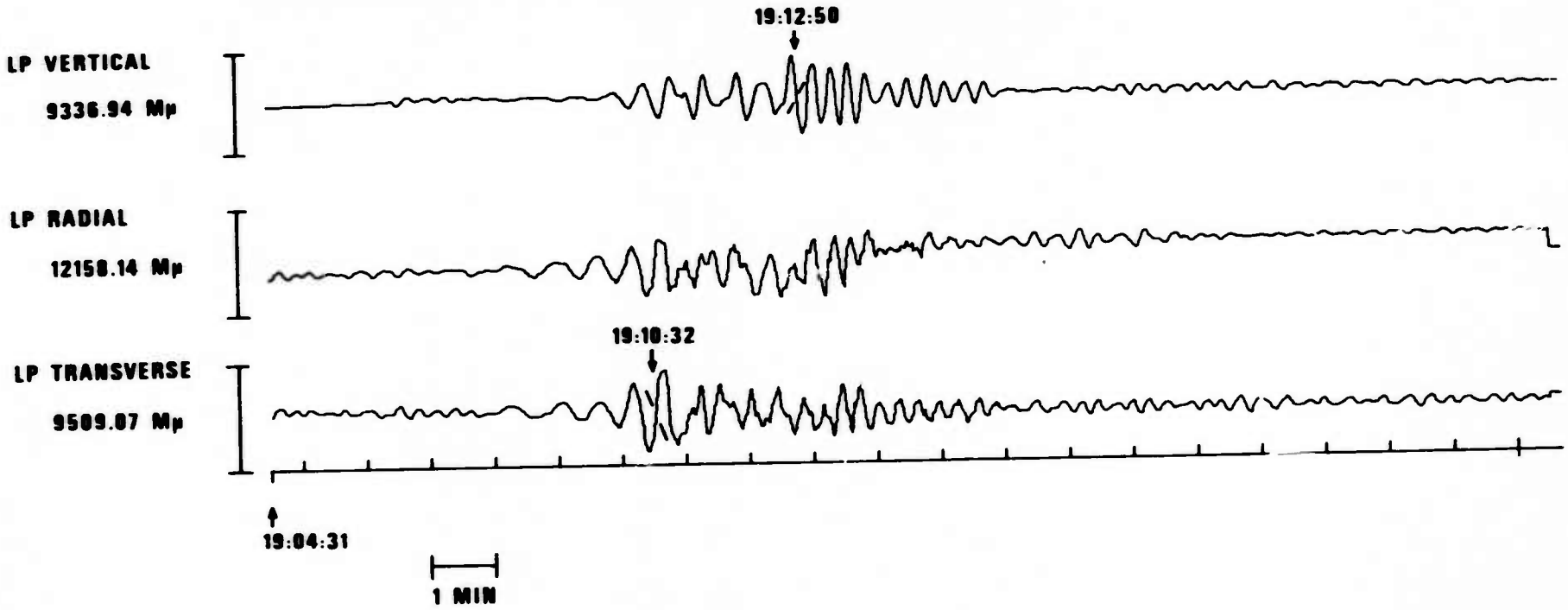



RK-ON 30 JUN 75
LPZ
38842.50 Mp
LPR
48566.50 Mp
LPT
32188.00 Mp
TIME
19:02:15
19:01:21
19:02:06
2 MIN


CPSO 30 JUN 75
19:07:23
19:05:59
LPZ
26820.15 Mp
LPN
UNKNOWN*
LPE
86494.81 Mp
2 MIN
*CALIBRATION QUESTIONABLE


WH2YK 30 JUN 75
19:07:52
LPZ
30207.60 Mp
LPR
12527.97 Mp
19:06:27
LPT
13531.65 Mp
TIME
2 MIN
19:07:06


FN-WV 30 JUN 75
LPZ
7818.88 Mp
LPR
8385.28 Mp
LPT
8357.78 Mp
TIME
2 MIN
18:18:88


ALPA LONG-PERIOD BEAMS 30 JUN 75
19:12:50
LP VERTICAL
9336.94 Mμ
LP RADIAL
12158.14 Mμ
19:10:32
LP TRANSVERSE
9589.87 Mμ
19:04:31
1 MIN

-15-

# LASA LONG-PERIOD BEAMS 30 JUN 75